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## ATTEMPTS TO EXTRACT RARE-EARTH ELEMENTS FROM SOME MINERALS AND THE SEPARATION OF THESE ELEMENTS

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A number of problems in this most interesting field of inorganic chemistry have not yet been solved. Some of these problems are now being strictly defined (for instance, those connected with the formation of complexes and preparation of pure metals of the yttrium group), while others require a transition from qualitative to precise quantitative treatment. To the latter group belong primarily the exact determination of atomic weights and of the solubilities of a number of compounds which are used in analyses and separations.

The solution of the majority of these problems is being delayed by the absence of sufficiently pure preparations of individual rare-earth-element compounds. This absence is due to the difficulty of carrying out the classical separation procedures. The method of electrochemical reduction which has been developed during recent years is not universally applicable, while separation by means of ion exchangers results in poor yields. For these reasons, fractional crystallization and fractional precipitation still remain the only universally applicable procedures.

To obtain pure compounds of the elements of the yttrium group, new methods for treating two USSR minerals have been developed. The procedures in question include decomposition of the minerals, purification of the rare-earth compounds from admixtures, separation into subgroups, and conversion of the prepared oxides of the total elements of the yttrium group into compounds suitable for subsequent crystallization. Preliminary work is being conducted at present on one of the two minerals. The total elements of the yttrium group have been separated from the second mineral and these elements are now being crystallized in the form of bromates.

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